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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,417	04/03/2006	Yoshio Kusano	IHW-050US	9321
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EXAMINER ESSEX, STEPHAN J				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/574,417

Applicant(s)

KUSANO ET AL.

Examiner

STEPHAN ESSEX

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The applicant's amendment filed on October 19, 2009 was received. Claim 7 was amended.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1-4 and 7-8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugita et al. (hereinafter "Sugita") (U.S. Pat. No. 6,455,179) in view of Suzuki et al. (hereinafter "Suzuki") (U.S. Pub. No. 2001/0021467A1) is maintained.

Regarding claims 1 and 2, Sugita teaches a fuel cell system **10**, comprising a first fuel cell stack **12** and a second fuel cell stack **14** which are arranged in parallel to one another. A piping system **28** is used to supply and discharge a fuel gas and an oxygen-containing gas to the first and second fuel stacks **12** and **14** (configured to receive reaction gases). The piping system **28** includes fuel gas supply tubes **192a** and **192b** (two portions, the lengths being substantially the same) which merge to make communication with a fuel gas supply port **194** (reaction gas supply pipe) (see col. 3, lines 11-14, col. 7, lines 56-57; figure 1).

Sugita is silent to a humidifier configured to humidify at least one of the reaction gases. Sugita is silent to a gas exhaust port of the humidifier. Sugita is silent to the humidifier being disposed between the two fuel cell stacks.

Suzuki teaches a humidifier **2** used for the humidification of a fuel cell, the humidifier having a plurality of water-permeable hollow fiber membranes (membrane type humidifier) accommodated within a housing in which gases each having a different moisture content flow inside and outside said hollow fiber membranes to carry out moisture exchange. Suzuki teaches moisture exchange between off gas (exhaust gas) discharged from a fuel cell and dry air to be used as the oxidant for a fuel cell (reaction gas). However, the humidifier is equally capable of humidifying the fuel for the fuel cell. An outlet **23b** (gas exhaust port) is provided for the humidified air (see paragraphs 12, 19, 75 and 92; figures 3A and 4A). It would have been obvious to one of ordinary skill in the art to have provided the humidifier of Suzuki at the fuel gas supply port of the fuel cell system of Sugita because Suzuki teaches that the power generation efficiency of the fuel cell system is reduced if the electrolyte membrane is dried (see paragraph 80).

Regarding claim 3, 7 and 12, Sugita teaches that each fuel cell stack **12, 14** comprises a plurality of fuel cell units stacked with each other in the horizontal direction (see col. 3, lines 31-35; figures 1 and 3).

Sugita teaches that the fuel gas supply port **194** (reaction gas supply port) and oxygen-containing gas discharge port **200** (reaction gas exhaust port) face the direction in which the fuel units are stacked (see figure 1).

Sugita teaches that the water-permeable hollow fiber membranes are aligned in one direction (see figure 21). The alignment of the hollow fiber membranes is parallel to the flow of the off gas and dry fuel (see figures 3A and 21). Therefore, the combination of Sugita and Suzuki as discussed in the rejection of claim 2 would result in the fuel cell

stack being stacked in the longitudinal direction of the water-permeable hollow fiber membranes and in the same direction as the flow of off gas and dry fuel. It would have been obvious to one of ordinary skill in the art to have provided the humidifier of Suzuki at the fuel gas supply port of the fuel cell system of Sugita because Suzuki teaches that the power generation efficiency of the fuel cell system is reduced if the electrolyte membrane is dried (see col. 9, lines 23-27).

Regarding claims 4, 10 and 11, Sugita teaches a fuel cell system **10**, comprising a first fuel cell stack **12** and a second fuel cell stack **14** which are arranged in parallel to one another (side-by-side relative to the horizontal).

Sugita does not teach a humidifier comprising at least two substantially cylindrical humidifiers arranged vertically adjacent to each other and an exhaust gas discharge pipe, configured to carry the exhaust gas discharged from the humidifier, disposed in a position surrounded by two humidifiers and one of the fuel cell stacks.

Suzuki teaches that humidifier **2** comprises two hollow fiber membrane modules **21** and **21** (substantially cylindrical humidifiers), placed at a predetermined space in parallel (arranged vertically adjacent to each other) and an outlet **22a** (exhaust gas discharge pipe) of the off gas (see paragraphs 83 and 91; figure 3A). In combining the humidifier of Suzuki with the fuel cell system of Sugita, the arrangement of the humidifier and the fuel cell stacks relative to the horizontal and the vertical is a design choice and does not inhibit or enhance the performance of the combination. Furthermore, the courts have held that the rearrangement of parts is likely to be obvious when doing so would not have modified the operation of the device. See *In re Japikse*

181 F.2d 1019, 86 USPQ 70 (CCPA 195) (see MPEP § 2144.04). Therefore, it would have been obvious to one of ordinary skill in the art to rearranged the fuel gas supply port of Sugita to point back between the two fuel stacks and to have connected the humidifier of Suzuki thereto in order to sandwich the humidifier between the two fuel cell stacks in order to make easier the accommodation of the combined system.

Regarding claim 8, Sugita teaches that the piping mechanism **28** (see rejection of claim 1) is incorporated on a side of second end plates **24, 26**. First end plates **16, 18** are provided opposite on the opposite side of the fuel cell stack (see col. 3, lines 20-24; figure 1).

4. The rejection of claim 9 under 35 U.S.C. 103(a) as being unpatentable over Sugita and Suzuki as applied to claims 1-4, 7, 8 and 10-12 above, and further in view of Kickuchi et al. (hereinafter "Kickuchi") (U.S. Pub. No. 2002/0142209A1) is maintained.

Regarding claim 9, Sugita and Suzuki are silent to a fuel cell box, the end plates of the two fuel cell stacks being fixed to the fuel cell box.

Kickuchi teaches a fuel cell stack **50** comprising a cell stack **13** and a case **54** (fuel cell box) for accommodating the cell stack **13**. End plates **52a** and **52b** are attached to the case **54** by a hinge mechanism **106** (fixed to the fuel cell box) (see paragraph 39 and 51; figure 1). It would have been obvious to one of ordinary skill in the art to have provided the case of Kickuchi in the modified fuel cell system of Sugita and Suzuki in order to protect the fuel cell stacks and humidifier.

Response to Arguments

5. Applicant's arguments filed October 19, 2009 have been fully considered but they are not persuasive.

Applicant's principle arguments are as follows:

A) *Suzuki and Sugita, alone or in combination, fail to disclose a humidifier disposed between two fuel cell stacks.*

B) *There is no teaching or suggestion in the cited prior art references to use a bifurcated supply pipe having equal length portions.*

C) *The particular configurations recited in claims 4, 10 and 11 do enhance the performance of the claimed fuel cell.*

6. In response to this arguments, please consider the following comments:

A) In providing a humidifier at the fuel gas supply port **194** of Sugita, a humidifier is provided between the first and second fuel cell stacks **12** and **14** of Sugita because the fuel gas supply port **194** is located between the first and second fuel cell stacks **12** and **14** (see figures 1 and 16). This arrangement does not require separating the fuel cell stacks **12** and **14** from one another.

B) Sugita teaches that the fuel gas supply port **194** communicates with fuel gas supply tubes **192a** and **192b** to supply fuel gas to the first and second fuel cell stacks **12** and **14**, respectively (see col. 7, lines 56-57). The fuel gas supply port **194** is centrally located relative to the first and second fuel cell stacks **12** and **14** and the fuel gas supply tubes **192a** and **192b** are of equal length (see figures 1 and 16).

C) Sugita teaches the horizontal arrangement of the fuel cell stacks **12** and **14**. Suzuki teaches a humidifier **2** having two parallel hollow fiber membrane modules **21** and **21** each having a substantially cylindrical shape (see paragraph 83). Sugita does not teach the hollow fiber membrane modules **21** and **21** being arranged vertically or horizontally with respect to each other, however such an arrangement is only relative to the position of the humidifier **2**.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHAN ESSEX whose telephone number is (571) 270-7866. The examiner can normally be reached on Monday - Friday, 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SJE

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795